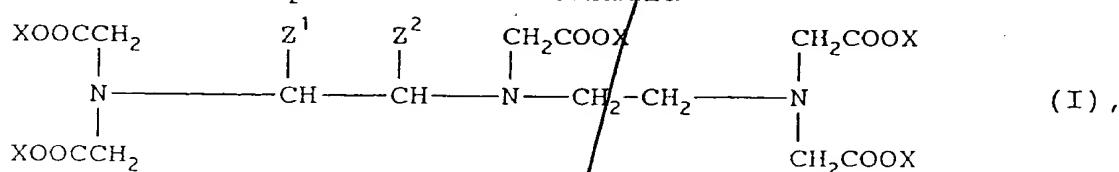


WHAT IS CLAIMED IS:

1. A compound of the formula



wherein

z^1 and z^2 in each case independently are the residue

$$-\text{CH}_2\text{)}_m-\text{C}_6\text{H}_4)_n-\text{O})_k-\text{CH}_2\text{)}_p-\text{C}_6\text{H}_4)_q-\text{O})_r-\text{R},$$

wherein

m and n independently are 0-20,

k, l, q and r each independently is 0 or 1,

R is hydrogen, optionally OR¹-substituted

C_1-C_6 -alkyl or CH_2COOR' ,

R^1 is hydrogen, C_1 - C_6 -alkyl or benzyl,

X is a hydrogen atom and/or a metal ion equivalent of an element of atomic number 21-29, 42, 44 or 57-83, with the provisos that at least two of the substituents X represent a metal ion equivalent; that one of the substituents Z^1 and Z^2 is hydrogen and the other is not hydrogen; and that when n and l each are 0, then k and r are not each simultaneously 1; that $-(O)_r-R$ is not $-OH$; and that Z^1 and Z^2 are not $-CH_2-C_6H_4-O-CH_2-COOCH_2C_6H_5$ or $-CH_2-C_6H_4-O-(CH_2)_5-COOCH_2C_6H_5$.

or a physiologically acceptable salt thereof with an inorganic and/or organic base, an amino acid or an amino acid amide.

510 505 9412 49 5051302
viii, 1 - 2

F

2. A ~~method~~ compound of claim ~~X_n~~ ⁴⁴ wherein z^1 is hydrogen and z^2 is $-(CH_2)_m-(C_6H_4)_q-(O)_k-(CH_2)_n-(C_6H_4)_l-(O)_r-R$, which is not hydrogen.

F

3. A ~~method~~ compound of claim ~~X_n~~ ⁴⁴ wherein z^2 is hydrogen and z^1 is $-(CH_2)_m-(C_6H_4)_q-(O)_k-(CH_2)_n-(C_6H_4)_l-(O)_r-R$, which is not hydrogen.

F

4. A ~~method~~ compound of claim ~~X_n~~ ⁴⁴ wherein z^1 is
 $-CH_2-C_6H_4-OCH_3$, ~~-CH₂-C₆H₅~~, $-CH_2-C_6H_4-O-CH_2-C_6H_4-OCH_3$,
 $-CH_2-O-CH_2-C_6H_5$, $-CH_2-C_6H_4-O-CH_2-COOH$, $-CH_2-C_6H_4-OC_2H_5$,
 $-CH_2-C_6H_4-OC_4H_9$ or $-CH_2-C_6H_4-O-CH_2-C_6H_5$.

a

F

5. A ~~method~~ compound of claim ~~X_n~~ ⁴⁴ wherein z^2 is
 $-CH_2-C_6H_4-OCH_3$, ~~-CH₂-C₆H₅~~, $-CH_2-C_6H_4-O-CH_2-C_6H_4-OCH_3$,
 $-CH_2-O-CH_2-C_6H_5$, $-CH_2-C_6H_4-O-CH_2-COOH$, $-CH_2-C_6H_4-OC_2H_5$,
 $-CH_2-C_6H_4-OC_4H_9$ or $-CH_2-C_6H_4-O-CH_2-C_6H_5$.

a

Sub 2

6. A compound of claim 1, wherein at least one X is Gd.

7. A compound of claim 4, wherein at least one X is Gd.

8. A compound of claim 5, wherein at least one X is Gd.

9. Gadolinium complex of 3,6,9-triaza-
3,6,9-tris(carboxymethyl)-4-(4-methoxybenzyl)-
undecanedioic acid;

europium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-methoxybenzyl)undecanedioic acid;

iron(III) complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-methoxybenzyl)undecanedioic acid;

bismuth complex of 3,6,9-triaza-3,6,9-tris(carboxy-

50

methy1)-4-(4-methoxybenzyl)undecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-5-(4-methoxybenzyl)undecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-[4-(4-methoxybenzyloxy)benzyl]undecanedioic
acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-benzylundecanedioic acid;
ytterbium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-benzylundecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-benzyloxymethylundecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-carboxymethoxybenzyl)undecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-ethoxybenzyl)undecanedioic acid;
europium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-ethoxybenzyl)undecanedioic acid;
iron complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-ethoxybenzyl)undecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-butoxybenzyl)undecanedioic acid;
europium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-butoxybenzyl)undecanedioic acid;
iron complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-butoxybenzyl)undecanedioic acid;
gadolinium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-benzyloxybenzyl)undecanedioic acid;
europium complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-benzyloxybenzyl)undecanedioic acid;
iron complex of 3,6,9-triaza-3,6,9-tris(carboxy-
methyl)-4-(4-benzyloxybenzyl)undecanedioic acid.
each a compound of claim 1.

Sub. A 3

~~10. A pharmaceutical composition comprising a compound of claim 1 and a pharmaceutically acceptable carrier~~

~~11. A method of enhancing an NMR image comprising administering to a patient a compound of claim 1, wherein at least one X is of atomic number 21-29, 42, 44 or 58-70.~~

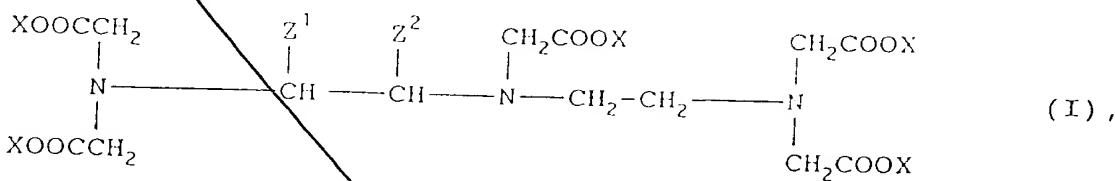
~~12. A method of enhancing an X-ray image comprising administering to a patient a compound of claim 1, wherein at least one X is of atomic number 21-29, 42, 44 or 57-83.~~

~~13. A method of claim 11, wherein the renal system or the hepatobiliary system is imaged.~~

~~14. A method of claim 12 wherein the renal system or the hepatobiliary system is imaged.~~

~~15. In a method of conducting radiation therapy of a patient comprising administering a radioactive metal ion to the patient, the improvement wherein the radioactive metal ion is administered in the form of a compound of claim 1.~~

~~16. A method of enhancing an NMR image of the GI tract of a patient comprising administering a compound of the formula~~



51

wherein

a *add* *water*

add *NaOH*

add *BF₃*

add *LiAlD₄*

add *NaOEt*

add *Et₃NH⁺*

add *NaBH₄*

add *NaBH₃T*

add *K₂T*

m and n independently are 0-20,
k, l, q and r each independently is 0 or 1,
R is hydrogen, optionally OR¹-substituted
C₁-C₆-alkyl or CH₂COOR¹,
R¹ is hydrogen, C₁-C₆-alkyl or benzyl,
x is a hydrogen atom and/or a metal ion equivalent of
an element of atomic number 21-29, 42, 44 or 57-83,
with the provisos that at least two of the substituents x
represent a metal ion equivalent; that one of the
substituents Z¹ and Z² is hydrogen and the other is not
hydrogen; and that when n and l each are 0, then k and r
are not each simultaneously 1,
or a physiologically acceptable salt thereof with an
inorganic and/or organic base, an amino acid or an amino
acid amide.